

Bitterroot Elk Project Progress Report

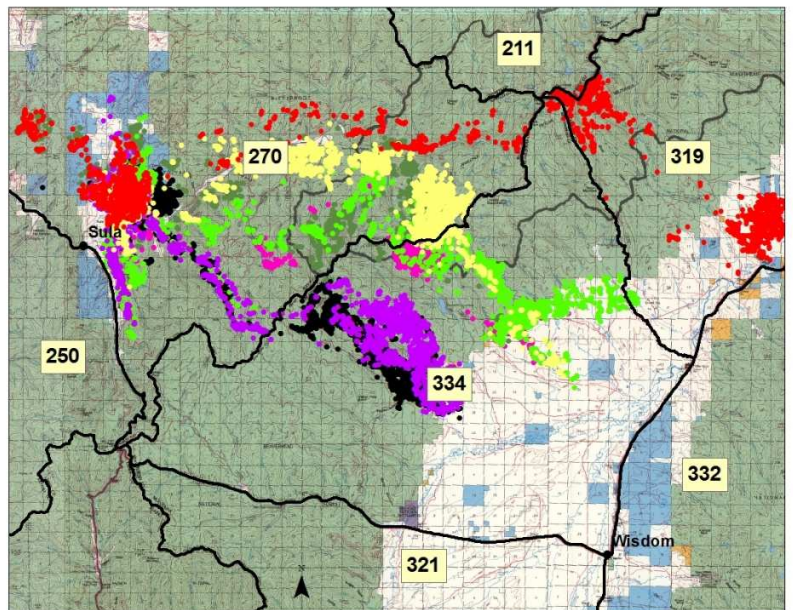
Spring 2012

Montana Fish, Wildlife, and Parks (FWP) and the University of Montana (UM) are entering the second year of a three-year study aimed at understanding what factors are having the most influence on elk survival, productivity, and calf recruitment. The overall elk population trend and the number of elk calves surviving from birth through their first winter has declined in the Bitterroot Valley since 2004, including a Bitterroot Valley-wide historic low in elk calf recruitment in 2009. FWP has tightened hunting regulations across the southern valley to match these declining trends. In this relatively predator-rich environment, decreased calf to cow ratios and population declines are raising concerns that increasing numbers of large carnivores, including wolves, mountain lions and black bears, may be the cause. The purpose of the research project is to investigate the role of mountain lion, wolf, and black bear predation, as well as habitat and nutrition, on elk population dynamics.

Adult Elk Movements and Health Assessments

During February 2011, we captured 44 adult female elk and outfitted each of them with a radiocollar that collected a GPS location every 2-hours. These elk were monitored through January 2012, and collars dropped off elk mid-January. During the monitoring period, two collars failed and seven elk died. One elk was killed in March 2011 by a lion in the West Fork, and one elk was killed in March 2011 by wolves in the East Fork. Additionally, three elk died of natural causes in the East Fork, and two elk died of unknown causes.

The GPS radiocollar data documented elk movements from February 2011 – January 2012. GPS collars in the East Fork area have been retrieved and the data downloaded. Collars in the upper West Fork area will be retrieved after snow conditions improve. Some of the elk captured in the French Basin and Reimel Ridge area migrated across the continental divide to summer ranges in the upper Big Hole Valley, with 1 elk moving east as far as Fishtrap Creek in hunting district 319 (see Figure on right), approximately 40 miles away. Collar data shows frequent winter movements of individuals between hunting district 250 and 270 in the HWY 93 area around Sula.



Map of GPS radiocollar location data from 7 adult elk during Feb 2011 – Jan 2012. Elk were captured in the French Basin area of HD 270. Black lines represent hunting district boundaries and labels identify hunting districts.



During the winter 2011-12, we captured and radio collared 40 additional adult female elk. One of the upper West Fork collared elk was killed by wolves and one of the East Fork collared elk was killed by a lion. We collected blood samples to determine pregnancy status and screen for exposure to disease during capture. Pregnancy rates from all elk tested during this project are 91% for elk in the East Fork area, 90% for elk in the HY 93 area of hunting district 250, and 63% for elk in the upper West Fork area. In addition to having lower pregnancy rates, upper West Fork elk were in poorer body condition than East Fork elk. Estimated body fat for all elk assessed to date was 6.9% for elk in the East Fork area, 7.4% for elk in the HY 93 area, and 5.6% for elk in the upper West Fork area.



Above: Dr. Ramsey conducting a calf necropsy. The lungs showed evidence of severe pneumonia infection – lung tissue was consolidated and discolored.

Pathology later confirmed the diagnosis.

Elk Calf Survival

In late-May and early June 2011, the elk calf survival study was initiated. We captured 66 newborn elk calves in May-June 2011, 31 six month old calves in late November 2011, and outfitted each calf with a VHF ear tag transmitter. Since their initial capture, we have been monitoring calves several times a week using aerial and ground telemetry to keep track of calf movement and survival. As with the GPS collars on adult females, these VHF ear tags emit a mortality signal if stationary for more than four hours. When a mortality signal was detected, we located the tag and conducted a thorough investigation of the site as well as a comprehensive onsite necropsy. We collected

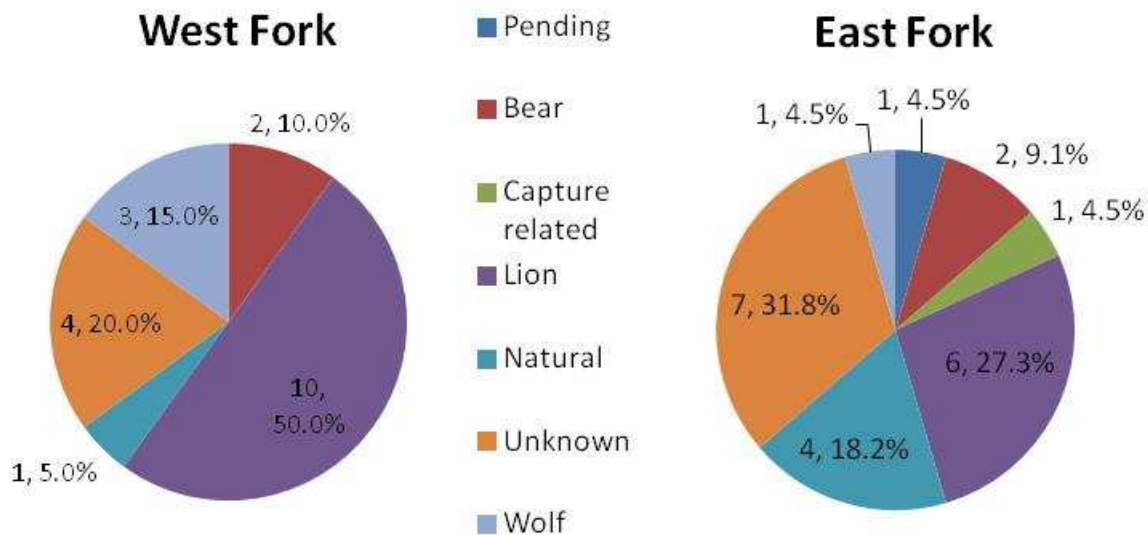
information on the presence of predator sign (tracks, scat, hair), the state of the carcass, the location, diameter and spacing of puncture wounds, location and size of claw marks, presence and location of subcutaneous hemorrhaging, and how much and what parts of the carcass had been consumed. If present, we collected predator scat and hair for DNA analysis to identify predator species, and used this information to confirm the accuracy of cause of death assigned based on the site investigation and necropsy.

Only one of the initial 66 eartags remains active on a live calf. Of the 65 tags that are no longer active, 28 were recovered from known mortalities and 37 were recovered without any sign of calf mortality (tag loss). The high level of tag loss was a setback for the project, and we have redesigned ear tags to minimize this problem in 2012. However, a successful November calf capture boosted sample sizes entering into the winter period and will allow a rigorous analysis of cause-specific mortality throughout the year. Fourteen of the 31 eartags put out in late November have been recovered, all from confirmed mortalities. Of these 42 cumulative known mortalities, one was capture related, five were natural mortalities, four were killed by black bears, four by wolves, and 16 by cougars (see figure on next page). An additional 12 died of unknown causes and evidence is still pending in one of these unknown cases.



Ear retrieved from a calf mortality investigation showing evidence that tag attachment sites enlarged in some animals, allowing ear tags to pull out. Redesigned tags will be deployed in 2012.





Above: Of the 42 elk calf mortalities, the number and percentage of mortalities that were due to black bear, cougar, and wolf predation, natural causes, capture, natural causes, and unknown causes. Calves were assigned to East Fork and West Fork based on their capture location.

Below: Thorough mortality investigations are conducted to assign cause of death for each calf mortality. The pictures below describe a mortality investigation that attributed cause of death to lion predation as an example. Calf #111 was captured on November 28th, 2011 and her eartag was heard on live mode on February 6th. On February 9th, a mortality signal was detected and the mortality investigation was conducted the following day. Picture A – At the scene, the calf was partially cached and lion prints were obvious in the snow. All limbs were attached to the carcass, and it was relatively intact. No other carnivore tracks were in the area. Picture B – Evidence of hair plucking was observed on the hide. Picture C – After extracting the carcass, there were puncture wounds evident along the neck. Picture D – After opening the neck, subcutaneous bleeding in the neck and around puncture wounds indicated that the calf was alive at the time the bite occurred. This important piece of information helped confirm that a lion killed this calf as opposed to simply scavenging it.



We are planning to capture and eartag up to 80 newborn elk calves during late May and early June, 2012. Eartags deployed in 2012 will have a different design than those deployed in 2011 – a different backing will hold the tag firm to calves' ears, preventing slipping. Similar to year 1, calves will be intensively monitored throughout the year so that mortalities are quickly identified and investigated. During summer 2012 we will initiate a vegetation monitoring program in order to better understand forage and habitat differences between the West Fork and East Fork. Using a combination of field vegetation sampling, remote sensing vegetation indices, and land cover data, we will estimate elk nutritional resources on important elk summer ranges. This will allow us to eventually investigate how nutritional resources affect elk body condition, pregnancy rates, calf birth weights, and ultimately calf survival.



We would like to thank the landowners that have allowed access for elk captures and provided logistical support. We would also like to thank the organizations and individuals that have provided financial support for this project: Ravalli County Sportsman's Association, Montana Bowhunter's Association, Hellgate Hunters and Anglers, Rocky Mountain Elk Foundation, Safari Club International Foundation, Montana Chapter of the Safari Club, the Shikar-Safari International Club, Hunting GPS Maps, McIntire-Stennis Foundation (USDA), the Bitterroot and Beaverhead-Deerlodge resource advisory councils, the U. S. Forest Service, and private donations from individuals in the community. Funding was also provided by revenues from the sale of Montana hunting and fishing licenses and matching Federal Aid in Wildlife Restoration grants to Montana Fish, Wildlife, and Parks.

